

Docket JP920000136US1

Appl. No.: 09/826,710  
Filed: April 5, 2001IN THE CLAIMS

Please amend the claims as indicated below.

1. (currently amended) In a computer environment, a method for searching data to locate a portion of said data identified by a search query, the method comprising:

receiving a search query including two or more data-fragments expected to be contained within said data; and

~~searching the data to locate matches between the data and the respective data-fragments;~~  
~~and~~

~~identifying a minimal portion of said data that contains matches with all of the data fragments, wherein at least one of the data fragments appears only once in the minimal portion.~~

searching the data for a minimal portion thereof, wherein to qualify as a minimal portion a portion of the data must contain: i) all the search query fragments and ii) no more than one occurrence of at least one of the search query fragments, and a portion of the data may qualify as a minimal portion even if: i) the data portion contains more than one occurrence of other ones of the search query fragments and ii) a sequence of the search query fragments in the data portion is different than a sequence of the fragments in the search query, and wherein if a data portion qualifies as a minimal portion the method includes the step of identifying the data portion as a minimal portion.

2. (currently amended) A method according to Claim 1, wherein one of said search query fragments is a first fragment occurring in the searched data and one of said search query fragments is a last fragment occurring in the searched data and the identifying includes comprising identifying a portion of said data containing all of said search query data-fragments and extending between:

an end location, wherein the end location is a location of a which is the location of the first match with that one of said last search query data-fragments which is the last to appear in the data; and

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a start location, wherein the start location is a location of a which is the location of the match, next preceding said end location, with that one of the said first search query data fragments which is the first to appear in the data.

3. (currently amended) A method according to Claim 1, wherein the step of searching includes comprising the steps of:

- (i) receiving said data in a computer memory;
- (ii) receiving a search query comprising two or more data fragments;
- (iii) searching the data to locate matches between the data and the respective search query data fragments;
- (iv) recording the memory addresses of said matches;
- (v) for each match, identifying any partial overlap with any other match;
- (vi) for any such partial overlap, searching said data to seek a new match which does not overlap any other match; and
- (vii) identifying a portion of said data from a the location of a the first non-overlapping match to a location of a the last non-overlapping match.

4. (currently amended) A method according to Claim 1, comprising the steps of:

- (i) storing the search query data fragments in computer memory as respective a string variables having string lengths;
- (ii) searching the data to locate the first matches between the data and the respective search query each data fragments and, for each data fragment, store storing the locations of the respective that first matches as a respective pointer variables;
- (iii) by reference to the pointer variables and the string lengths of the search query data fragments determining any partial overlaps between said matches;
- (iv) for any such partial overlap, searching the data to locate a the next match with one of the search query relevant data fragments and storing a store the location of that next match in a respective further pointer variable;

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(v) by reference to said pointer variables determining any remaining partial overlaps between said matches and repeating step (iv) until there is identified a portion of said data containing all of said search query data fragments without any overlaps therebetween.

5. (currently amended) A method according to Claim 1, wherein the step of identifying includes including displaying said data upon a display screen and highlighting said identified portion of data.

6. (currently amended) A system for searching data to locate a portion of said data identified by a search query, the apparatus comprising:

input means for receiving a search query including two or more data fragments;  
data supply means for supplying data to be searched;  
control means connected to said input means and said data supply means and operable for searching data made available by the data supply means to locate matches between the data and the respective data fragments, and means for registering information identifying a minimal portion of said data that contains matches with all of the data fragments, wherein at least one of the data fragments appears only once in the minimal portion: for a minimal portion thereof, wherein to qualify as a minimal portion a portion of the data must contain: i) all the search query fragments and ii) no more than one occurrence of at least one of the search query fragments, and a portion of the data may qualify as a minimal portion even if: i) the data portion contains more than one occurrence of other ones of the search query fragments and ii) a sequence of the fragments in the data portion is different than a sequence of the fragments in the search query; and

minimal portion identifying means for identifying a data portion as such a minimal portion if the data portion qualifies as such a minimal portion.

7. (currently amended) A computer program product comprising a body of computer code for rendering a computer operable for searching data to locate a portion of the data identified by a user supplied search query, the product comprising:

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a computer code portion for enabling the computer to receive a search query including two or more data fragments;

a computer code portion for searching the data for a minimal portion thereof, wherein to qualify as a minimal portion a portion of the data must contain: i) all the search query fragments and ii) no more than one occurrence of at least one of the search query fragments, and a portion of the data may qualify as a minimal portion even if: i) the data portion contains more than one occurrence of other ones of the search query fragments and ii) a sequence of the fragments in the data portion is different than a sequence of the fragments in the search query; and directing the computer to search said data to locate matches between the data and the respective data fragments; and

a computer code portion for causing the computer to identify a minimal portion of said data that contains matches with all of said data fragments, wherein at least one of the data fragments appears only once in the minimal portion.

minimal portion identifying computer code for identifying a data portion as such a minimal portion if the data portion qualifies as such a minimal portion.

8. (new) A system according to Claim 6, wherein one of said search query fragments is a first fragment occurring in the searched data and one of said search query fragments is a last fragment occurring in the searched data and the identifying includes identifying a portion of said data containing all of said search query fragments and extending between:

an end location, wherein the end location is a location of a first match with that one of said last search query fragments; and

a start location, wherein the start location is a location of a match, next preceding said end location, with that one of said first search query fragments.

9. (new) A system according to Claim 6, wherein the control means includes:

means for searching the data to locate matches between the data and the respective search query fragments;

means for recording memory addresses of said matches;

means for identifying, for each match, any partial overlap with any other match;

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means for searching for any such partial overlap, said data to seek a new match which does not overlap any other match; and

means for identifying a portion of said data from a location of a first non-overlapping match to a location of a last non-overlapping match.

10. (new) A system according to Claim 6, wherein the control means includes:

the data supply means includes means for storing the search query fragments in computer memory as respective string variables having string lengths;

means for searching the data to locate first matches between the data and the respective search query fragments and establishing the locations of the respective first matches as respective pointer variables;

means for determining any partial overlaps between said matches by reference to the pointer variables and the string lengths of the search query fragments; and

partial overlap searching means for i) searching the data for any such partial overlap in order to locate a next match with one of the search query fragments and establishing a location of that next match in a respective further pointer variable and ii) determining any remaining partial overlaps between said matches by reference to said pointer variables, and repeating i) and ii) until there is identified a portion of said data containing all of said data fragments without any overlaps therebetween.

11. (new) A system according to Claim 6, wherein the minimal portion identifying means includes means for displaying said data upon a display screen and highlighting said identified portion of data.

12. (new) A computer program product according to Claim 7, wherein one of said search query fragments is a first fragment occurring in the searched data and one of said search query fragments is a last fragment occurring in the searched data and the minimal portion identifying computer code includes computer code for identifying a portion of said data containing all of said search query fragments and extending between:

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an end location, wherein the end location is a location of a first match with that one of said last search query fragments; and

a start location, wherein the start location is a location of a match, next preceding said end location, with that one of said first search query fragments.

13. (new) A computer program product according to Claim 7, wherein the computer code for searching the data includes:

computer code for searching the data to locate matches between the data and the respective search query data fragments;

computer code for recording memory addresses of said matches;

computer code for identifying, for each match, any partial overlap with any other match,;

computer code for searching said data, for any such partial overlap, to seek a new match which does not overlap any other match; and

computer code for identifying a portion of said data from a location of a first non-overlapping match to a location of a last non-overlapping match.

14. (new) A computer program product according to Claim 7, comprising:

computer code for storing the search query data fragments in computer memory as respective string variables having string lengths;

computer code for searching the data to locate first matches between the data and the respective data fragments and establishing the locations of the respective first matches as respective pointer variables;

computer code for determining any partial overlaps between said matches by reference to the pointer variables and the string lengths of the data fragments;

partial overlap searching computer code for i) searching the data for any such partial overlap in order to locate a next match with one of the search query fragments and establishing a location of that next match in a respective further pointer variable and ii) determining any remaining partial overlaps between said matches by reference to said pointer variables, and

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repeating i) and ii) until there is identified a portion of said data containing all of said data fragments without any overlaps therebetween.

15. (new) A computer program product according to Claim 7, wherein the minimal portion identifying computer code includes computer code for displaying said data upon a display screen and highlighting said identified portion of data.